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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,127	07/29/2003	Chris E. Barns	ITL.1016US (P16703)	5928

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EXAMINER	
DUONG, KHANH B	
ART UNIT	**PAPER NUMBER**
2822	

DATE MAILED: 08/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/629,127	BARNS ET AL.
	Examiner	Art Unit
	Khanh B. Duong	2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 and 16-28* is/are pending in the application.

4a) Of the above claim(s) *20-24* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,16-19 and 25-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This office action is in response to the amendment filed May 23, 2005.

Accordingly, claims 1, 2, 14 and 16 were amended, and new claims 25-28 were added.

Claims 20-24 remain withdrawn from consideration as being directed to a non-elected invention.

Currently, claims 1-14 and 16-19 remain active.

Response to Arguments

Applicant's arguments with respect to the amended claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3 and 5-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al. (U.S. Patent No. 6,800,530).

Re claims 1-3, Lee et al. ("Lee") discloses in FIG. 1 to 8 a method comprising: covering a polysilicon gate structure 30 with a nitride hard mask 52, said mask 52 and said gate structure 30 having opposed, common vertical surfaces; forming a sidewall spacer 72 that extends along a vertical surface and covers said gate structure 30 and covers at least part of said mask 52; and

removing said hard mask 52 using either a CMP process or a stripping process (etching) that is inherently selective of the hard mask 52 over the spacer 72 [see col. 4, lines 10-20]. Such inherent selective property of the stripping process toward the nitride hard mask is discussed by Yeh (U.S. Patent No. 5,023,694) at column 17, lines 8-12.

Re claims 5-8, Lee expressly discloses in FIG. 7 to 8 the mask 52 is removed after forming a silicide 137 by etching and/or polishing [see col. 4, lines 13-20].

Re claim 9, Lee discloses in FIG. 8 replacing the polysilicon gate structure 30 with a metal gate 133 replacement.

Re claim 10, Lee discloses in FIG. 2 forming the polysilicon gate structure including a patterned polysilicon portion 30 and underlying dielectric layer 20.

Re claim 12, Lee discloses in FIG. 3 forming the spacers 72 on either side of the polysilicon gate structure.

Re further claims 1-3, 11 and 12, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed ("to prevent the formation of a silicide on the gate structure", "protecting the polysilicon gate structure", etc.) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F. 2d 1647 (1987).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (U.S. Patent No. 6,800,530) in view of Lee (U.S. Patent No. 6,258,648).

Re claim 4, Lee '530 fails to disclose forming the mask 52 on at least one polysilicon gate structure 30 and removing the mask 52 over another gate structure to form a silicide on the another gate structure.

Lee '648 suggests in FIG. 2 to 6 forming a mask 26 on at least one polysilicon gate structure 10 and removing the mask 26 over another gate structure 10 to form a silicide 32 on the another gate structure 10.

Since Lee '530 and Lee '648 are from the same field of endeavor, the purpose disclosed by Lee '648 would have been recognized in the pertinent prior art of Lee '530.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Lee '530 with the suggestion of Lee '648 because of the desirability to selectively form salicide structures.

Furthermore, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed ("selectively protecting at least one polysilicon gate structure with the mask to prevent the formation of a silicide ") does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F. 2d 1647 (1987).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (U.S. Patent No. 6,800,530) in view of Wang et al. (U.S. Patent No. 6,248,002).

Re claim 13, Lee '530 fails to disclose using a two-step polish to remove said mask including a first step using a harder pad and a second step using a softer pad.

Wang et al. ("Wang") expressly suggests in FIG. 6 using a three-step polish including a first step using a harder pad and a second step using a softer pad.

Since Lee '530 and Wang are both from the same field of endeavor, the purpose disclosed by Wang would have been recognized in the pertinent prior art of Lee '530.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Lee '530 as suggested by Wang, since Wang states in the ABSTRACT that such modification would prevent the accumulation of particle impurities on the surface of a semiconductor substrate that contains wofram plugs during the process of polishing the surface of the wafer.

Claims 14, 16-19 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 6,258,648) in view of Lee et al. (U.S. Patent No. 6,800,530).

Lee '648 discloses in FIG. 2 to 6 a method comprising: selectively forming a nitride hard mask layer 26 on a first polysilicon gate structure 10; and forming a silicide 32 on a second polysilicon gate structure 10; and removing the hard mask 26 using a selectively etch (with a mask pattern 28 to form sidewall spacers 30).

Re claim 14 and 16-19, Lee '648 fails to disclose replacing the first polysilicon gate structure with a metal gate replacement.

Lee '530 suggests in FIG. 8 replacing a polysilicon gate structure 30 with a metal gate replacement 133, and removing mask 52 after forming a silicide 137.

Since Lee '648 and Lee '530 are both from the same field of endeavor, the purpose disclosed by Lee '530 would have been recognized in the pertinent prior art of Lee '648.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Lee '648 as suggested by Lee '530 because of the desire to form a temperature sensitive gate electrode so as to enhance device performance.

Re further claims 14 and 16-19, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed ("selectively preventing the formation of a silicide on a first polysilicon gate structure ", etc.) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F. 2d 1647 (1987).

Re claims 25-27, Lee '648 discloses said hard mask 26 is nitride, said first polysilicon structure 10 includes sidewall spacers (12, 30), and an (anisotropic) etch is used that is inherently selective of said nitride 26 [see col. 4, lines 2-7].

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee '648 and Lee '530 as applied to claims 14, 16-19 and 25-27 above, and further in view of Deckert et al. (U.S. Patent No. 4,269,654).

Re claim 28, Lee '648 and Lee '530 fail to disclose using ortho-phosphoric acid (H3PO4) to etch said mask.

Deckert et al. ("Deckert") suggests "[r]efluxing ortho-phosphoric acid is an excellent etch for silicon nitride, but it does not etch silicon oxide" [see col. 1, lines 35-38].

Since Lee '648, Lee '530 and Deckert are from the same field of endeavor, the purpose disclosed by Deckert would have been recognized in the pertinent prior art of Lee '648 and Lee '530.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined method of Lee '648 and Lee '530 in the manner as suggested by Deckert because of the desirability to selectively etch silicon nitride without etching silicon oxide.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh B. Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KBD

Michael Trinh
Primary Examiner
Art SPE